



PROFESSIONAL
EDUCATION

Digital Plus⁺
Programs

Online course

Industrial Internet of Things: From Theory to Application



**At their heart,
IoT systems are
characterized by
the convergence
of micro-sensing,
computation, and
communication.**

Brian W. Anthony

Index

- 04** / Technology Today
- 07** / About the course
- 08** / Key Takeaways
- 09** / Participant Profile
- 11** / Instructor
- 12** / Course Outline
- 13** / Enrollment Process
- 14** / Certificate of Completion
- 16** / About MIT Professional Education
- 18** / Why should you pursue an MIT Professional Education Online Course?
- 19** / The Beyond Online Methodology
- 21** / Benefits of Joining the Community
- 22** / Corporate Courses
- 23** / The Experience in Numbers
- 24** / Testimonials

Technology today

The Internet of Things (IoT) is taking the way we live and work to a whole new level. This technology allows anything from sensory devices to household

appliances be connected and interact through the internet, without any need for human intervention.



Welcome to the future of organizations.

These exhilarating conditions require leaders who adapt, learn continuously, and understand **that technology is the key to taking their organizations to a more beneficial**, optimized, and connected level.

Virtual



Clara Piloto

Director of Global Programs
at MIT Professional
Education

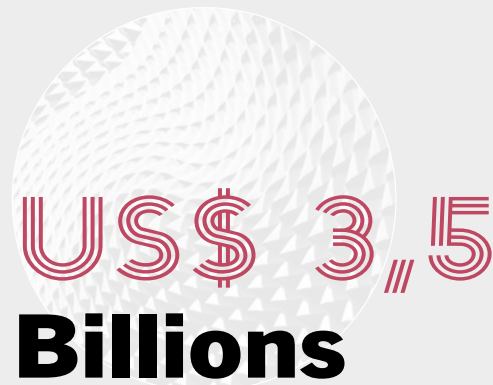
The Internet of Things is here to stay. As we embark upon Digital Transformation and Industry 4.0, we are witnessing increasing applications for the Internet of Things in professional settings to maintain organizations' competitive edge. IoT helps people live and work smarter, as well as gain increasingly more control over their lives.

Benefits of improving your digital strategy



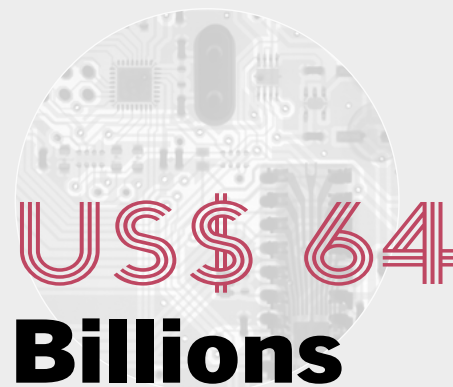
On average, over 80% of senior executives from all industries say that the IoT is fundamental to either some or all lines of their business.

Source: Statistics



The number of cellular IoT connections is expected to reach 3.5 billion by 2023.

Source: Ericsson



Over 64 billion IoT devices are expected worldwide by 2025.

Source: Business Insider, IoT Analytics, Gartner, Intel

About the course



9 weeks

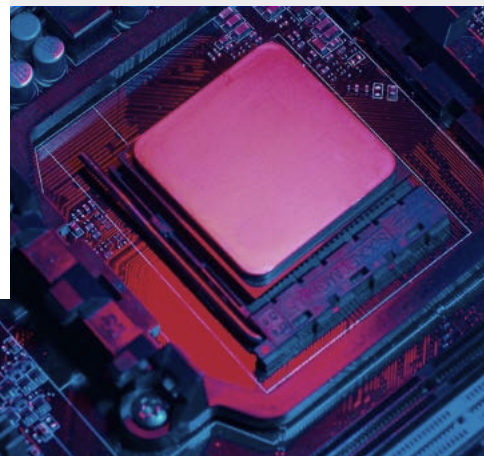


8-10 hours a week



Online

Throughout this course, you will study the main detection, computing, and communication software technologies that are central to the recent stream of IoT+ practices.



During the course, you will walk the path of technology through :

1

Develop your skills while overcoming technological challenges.

2

You will gain previously unheard-of insights into relations between the real and artificial world.

This will allow you to play a positive role over people, machines, environments and eco-systems, which you will also implement in your professional field.

The technology that allows you to detect, reason and make automated decisions is deeper and more complex than the mere Internet of Things (IoT). In this course, we will be introducing you to the technological concept that goes beyond IoT: IoT+.



Register

Key Takeaways

Throughout this course you will develop the following skills:



- 01 • **Design and assembly of integrated systems**, sensors, and IoT+ in which hardware and software interact.
- 02 • **Selection and definition** of teams or components that are available on the market.
- 03 • **Designing IoT+ products** that will help you reach your hardware and software's full potential.
- 04 • **Solutions to Data Science problems** using modern Machine Learning techniques.
- 05 • **Industry solutions** (transport, health, agriculture, etc.) using IoT+.
- 06 • **Construction of complete hardware and software systems** while being exposed to new and exciting hardware prototyping platforms.
- 07 • **Design and implementation** of telecommunication networks for the use of IoT+.
- 08 • **Utilization of sensors**, detection technologies, and integrated systems in the IoT+ setting.
- 09 • **Through IoT+**, you will use the technology at your disposal to develop and improve real applications with intelligent technologies.

Participant Profile

This course is for those who wish to become certified professionals in the IoT+ sector.

Engineers and engineering managers

Design and manufacturing engineers

who are looking to learn about data and modeling in the manufacturing industry.

Data scientists

who want to put their skills into practice in expanding fields like smart manufacturing.

Consultants

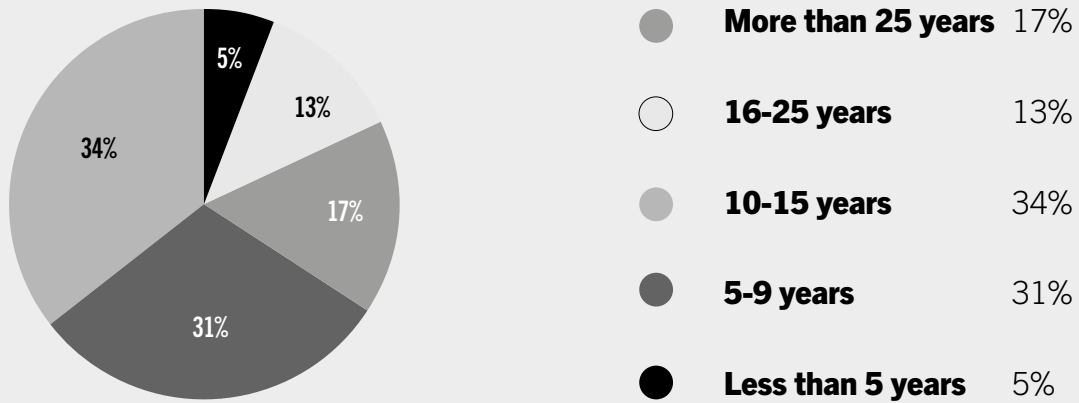
who aim to add value to the latest technological changes in the manufacturing process.

Requirements:

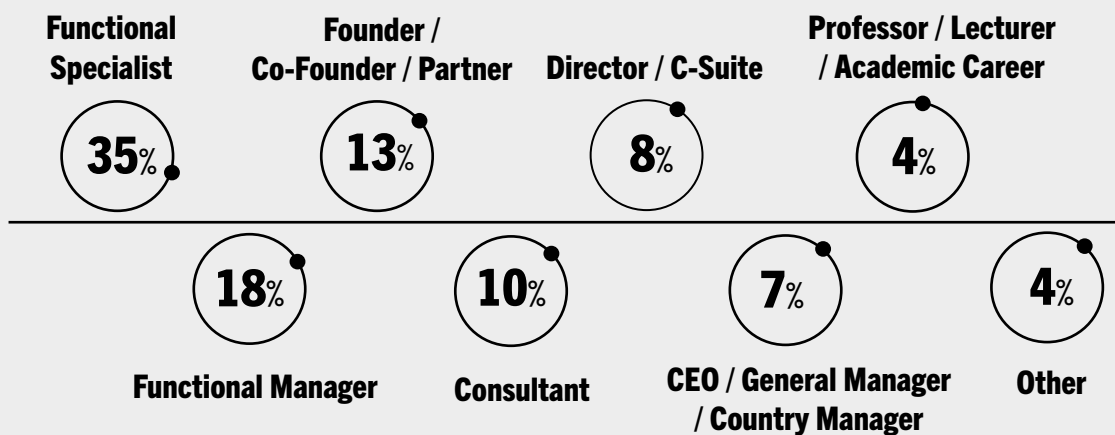
To enroll in this course it is not necessary to have previous knowledge of the material. However, for the activities we recommend:

- To have knowledge of courseware, preferably MATLAB and/or Python
- To have access to development environments with MATLAB and Python
- To possess an advanced level of physics and mathematics
- To have sufficient time available to profoundly understand the techniques on which the exercises are based, in order to fully take advantage of the course and to complete the evaluated activities successfully.

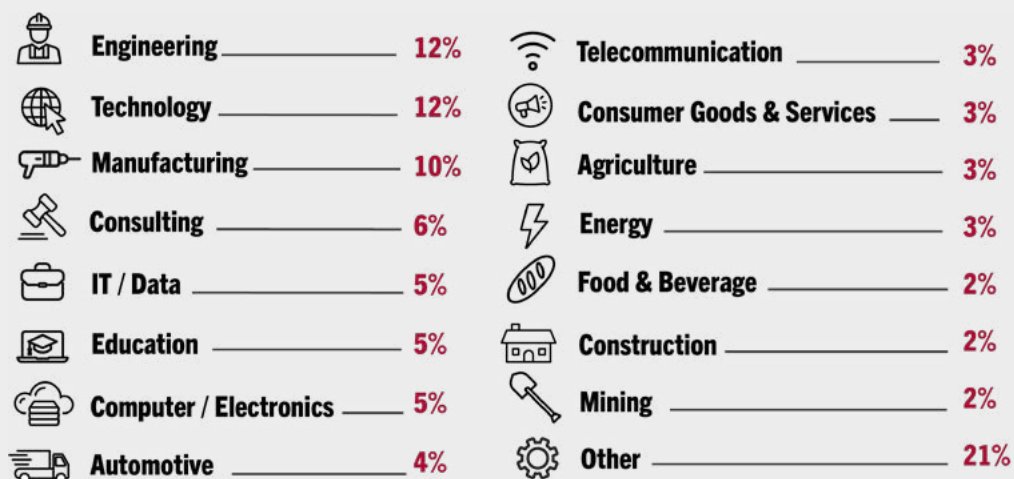
Year of Experience



Job Category



Industry



Instructor



Dr. Brian W. Anthony

Director of MIT's Geospatial Data Center

“At their heart, IoT systems are characterized by the convergence of micro-sensing, computation, and communication.”

Dr. Anthony is Director of MIT's Master of Engineering in Manufacturing Course, Co-Director of the Medical Electronic Device Realization Center, and Deputy Director for the MIT Skoltech Initiative. With over 20 years of experience in product realization—Dr. Anthony won an Emmy (from the Academy of Television Arts and Sciences) in broadcast technical innovation.

Dr. Anthony designs instruments and techniques to monitor and control physical systems. His work involves systems analysis and design and calling upon mechanical, electrical, and optical engineering, along with computer science and optimization, to create solutions. The focus of Dr. Anthony's research is in computational instrumentation—the design of instruments and techniques to measure and control complex physical systems. His research includes the development of instrumentation and measurement solutions for manufacturing systems and medical diagnostics and imaging systems.

In addition to Dr. Anthony's academic work, he has extensive experience in market-driven technology innovation, product realization, and business entrepreneurship and commercialization at the intersection between information technology and advanced manufacturing.

Course Outline

Introduction, Markets, Needs and Trends

1. What Is IoT and What Is There Beyond IoT?
2. Market Sectors
3. Needs and Use Cases
4. Platforms

Sensors Part 1

1. Selected Needs: A Complete Case
2. First Data Exploration and Preliminary Display
3. Detection System Contact
4. Introduction to Sensors
5. Choosing a Sensor.

Sensors Part 2

1. Data Acquisition
2. Fourier Transform
3. Time and Frequency
4. Basic Analysis and a Complex Case

Computing

1. Algorithms
2. Computing and Learning
3. Convolution
4. Power to Operate
5. Statistics
6. Cases with Statistics

Learning

1. Automated Learning Methods
2. Decision Trees
3. Joint Learning Part I
4. Joint Learning Methods Part II
5. Support Vector Machines
6. Neural Networks

Localization

1. Introduction to Localization
2. Waves
3. GPS
4. Inertial Detection
5. SLAM Technology

Communication

1. Introduction to Communication Detection Technologies

Integration Part I and II

* Course content may be changed for academic reasons.



Register

Enrollment Process

1

Complete the form on **the registration page.**

Your **place will be reserved** upon confirmation of payment.

2

3

You will receive a **welcome email** with the steps to follow.

You will then be able to access and familiarize yourself with the **virtual campus.**

4

5

The **course content** will be available on the start date.

You will begin your journey towards **MIT knowledge.**

6



Register

Certificate of Completion

All participants who successfully complete the course will receive an MIT Professional Education Certificate of Completion and 7.2 Continuing Education Units (CEUs*).

In order to obtain MIT CEUs, participants must complete a required MIT CEU confirmation form. MIT CEUs are calculated based on the number of learning hours in each course.



Massachusetts Institute of Technology

certifies that

Jane Smith

has successfully completed the online program

**Industrial Internet of Things:
from Theory to Application**

*A MIT CEU is a unit of credit equivalent to 10 hours of participation in an accredited course for professionals.



Welcome to the gateway

**to MIT knowledge and
expertise for professionals
around the globe**

About MIT Professional Education

MIT Professional Education fosters the development of innovative leaders equipped to address complex problems globally

MIT Professional Education provides continuing education courses and lifelong learning opportunities for science, engineering, and technology professionals at all levels, from around the world. Worthy of note is that **MIT professors and lecturers lead and teach all MIT Professional Education offerings**. Some of our courses have a long history, others are relatively new.

Our Digital Plus courses go beyond online, blending cutting-edge content delivered using the best of online technology and traditional classroom instruction, to **enable effective learning outcomes** in a flexible, collaborative learning environment. All MIT Professional Education courses offer certificates, and Continuing Education Units (CEUs), some offer MIT credit in addition.



MIT Professional Education is central to **MIT's vision**. It fulfills the mandate to connect practitioner-oriented education with industry, and to incorporate industry feedback and knowledge into MIT education and research.

The Institute is committed to generating, disseminating, and preserving knowledge, and to working with others to apply this knowledge **for the benefit of humankind**.



Bhaskar Pant

Executive Director of
MIT Professional Education



MIT Professional Education offers students not only a world-class technical education but also the expertise and increasingly essential human skills to convert that knowledge into real-world, adaptable solutions that benefit all of humankind.

Why should you pursue an MIT Professional Education Online Course?



- 01 • To fulfill your **reskilling and upskilling needs** in this fast-changing environment.
- 02 • To master **the technical and human skills** necessary for effective leadership.
- 03 • To learn proactively with our **hands-on methodology** and **real case applications**.
- 04 • To explore the latest knowledge with **MIT Faculty**, leaders in their respective areas.
- 05 • To build a **solid network with professionals** from diverse fields and nationalities.



Register

The Beyond Online Methodology

MIT Professional Education is revolutionizing the digital learning experience. In fact, we are no longer talking about online-only, but rather an interactive and collaborative learning experience that's digitally powered: a **Beyond Online experience.**

That is because not only will you have access to one of the most innovative e-learning platforms that utilizes the latest technology, you'll also have an opportunity to meet and work with some of the world's leading subject matter experts in the fields of technology.



With MIT Professional Education, you'll have an opportunity to:

1. Attend international workshops and live webinars
2. Collaborate and engage with world-renowned MIT faculty
3. Learn from external facilitators, guest speakers, and subject matter experts from various industries
4. Meet and network with other course participants from all around the world



Meet and work with some of the world's leading subject matter experts in the fields of technology

Even though our online courses are open to hundreds of participants, each cohort is capped at 50 participants. By connecting digitally and working in much smaller groups with colleagues from around the globe, you'll get the feeling of a **personalized learning experience**, as if you were in the same classroom.

We believe in practical applications for implementing what participants learn. That's why at MIT Professional Education, we give participants the **tools** to make their experience as fulfilling as possible:

1

Modular learning

2

Case applications

3

Share practices with your cohort

4

Self-assessment

5

Guided discussion forums

6

Weekly projects

7

Additional resources (videos, readings, etc.)

Benefits

of joining the Community

MIT Professional Education offers a number of benefits for participants who successfully complete this course:



- 01 • 15% discount for MIT Professional Education online courses and short-duration in-person courses.
- 02 • Access to the virtual campus for six months after completing the course.
- 03 • Exclusive announcements of new courses, courses, and events.
- 04 • Unlimited refresher resources and access to webinars.
- 05 • Invitation to the “MIT Professional Education” LinkedIn group, exclusively for alumni.
- 06 • Networking opportunities with other MIT Professional Education alumni.

Corporate Courses

At MIT Professional Education, we are committed to accompanying organizations as they aspire to provide their professionals with the ongoing education critical for **success in today's competitive environment**. That's why we offer plans for companies who wish to train their professionals with us.

Which Corporate Course best suits your organization's needs?

1

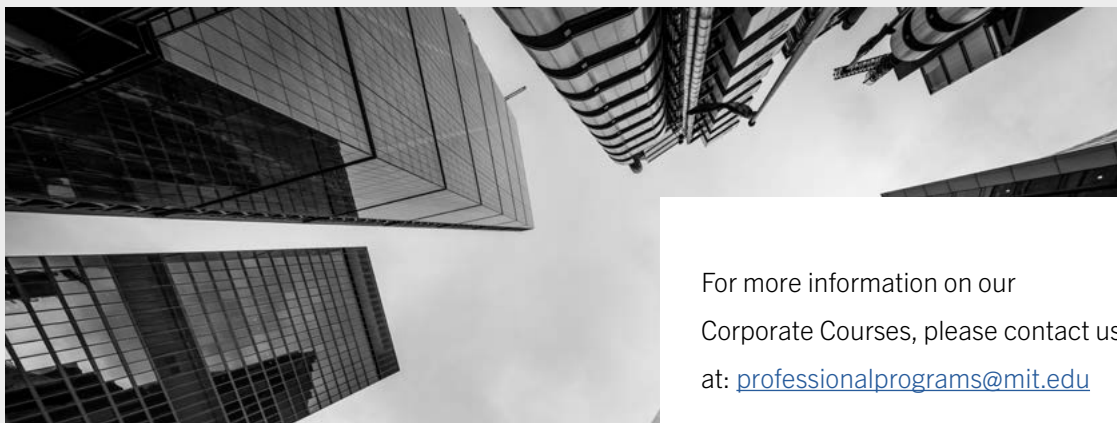
Standard courses

Teams or groups of at least 10 people, will obtain special conditions in their registration to any of our courses.

2

Custom courses

Custom-made to meet the specific needs of each company and its professionals.



For more information on our Corporate Courses, please contact us at: professionalprograms@mit.edu

The Experience in Numbers

94%

Would take another MIT
Professional Education course.

92%

Highly value their experience
with us.

91%

Consider it important or very
important to obtain an MIT
Professional Education Certificate.

+60,000

More than 60,000 participants in
our online courses

12,000

Over 12,000 women attending
our course

155

Participants from more than 155

470

470 hours of live webinars

+1,600

More than 1,600 online activities



Register

Testimonials



Andrea Julian

Functional Specialist, Continental



I really enjoyed this course, even as a non-engineering profile...I liked that the course focused on giving us a thorough understanding of IoT technologies, its applications and applications.



Juan Renzulli

Functional Specialist, Continental



This course provides a highly comprehensive view of the world of IoT+, which allows for an understanding the use and selection of sensors, as well as the interpretation of data and selection of algorithms suitable for the use of Machine Learning and Artificial Intelligence.

Are you ready to take the lead on the latest technologies?



PROFESSIONAL
EDUCATION

Digital Plus⁺
Programs



global  alumni
-excellence or nothing-

For more information,
please contact us.

USA: +1 (617) 861 2554

professionalprograms@mit.edu

professionalprograms.mit.edu